

Rob Gillion – 22nd September 2015

	I have props! Good evening my name's Rob Gillion. I'm a Project Manager for Biobank a bit like Steve. I'm also doing an enhancement project. You can look at imaging as an enhancement, it was something that was... came along after the original assessments that you all did. Activity monitoring is one of these and does anyone recognise these?
00:00:23	Hey, beat you Steve, got more! I want to talk a little bit about what they are, why we're doing it but more importantly what we're getting out of it. UK Biobank is all about the research that we can offer for scientists, the data that we can offer for scientists. And some time ago at one of my last hearing committees who tend to sort of look at what sort of stuff is out there that we could be doing, identified that physical activity was something that is actually really poorly represented and they set up a working group to look at the imaging at the activity monitoring project partly because you lot all told us about how active you were...
00:01:10	<i>We lied!</i>
00:01:10	Or not! But what we didn't know was whether you were lying or not. New technology has come on leaps and bounds and I don't know how many of you have heard about Fitbits from Nike or anything else that's out there in the modern world, even your smartphone can measure how many steps you take a day now – there's lots of non-evasive ways to actually measure what someone's actually doing during the day.
00:01:37	Now this is a market of technology that is changing immensely quickly but Biobank is slightly different, we want to do it for health related research and that means we have to look at things slightly differently.
00:01:53	We wanted to look at it for what sort of illnesses do people suffer. Does activity have a change or a difference to people who have a genetic disposition to something but are more active have a better outcome or vice versa. Don't really know.
00:02:11	What we set up to do was to actually instead of using the questionnaires actually use devices but we looked around at the devices that were out there and they had quite a lot of limitations. A lot of it was about raw data. We talked about some of the data that Biobank holds, we hold an awful lot of data but what we want to do is hold it in a form that we can actually pass to researchers that they can do what they need to. We don't want to put limitations on what that is.
00:02:41	Andrew talked a bit earlier about there's blood that we sample and we store. We don't do anything to it we just store it because we don't know what someone else is going to come up with in the future and it's the same with activity. It's also extremely expensive. For a sort of idea of scale Actigraph make an activity monitor which mounts on a belt around your waist which isn't terribly comfortable, costs about £900. That's very very expensive when you're talking about a study as big as you guys.
00:03:12	We ran a piece of work in combination with Cambridge an activity who are a spin off from the University of Newcastle. They came up with some new technology that actually enabled us to come up with one of these which was pretty much the first in its class in the world. I can measure data for a long period of time, very cheaply at really really good rates but, most importantly, it stores it in fundamental units of gravity. Now that doesn't mean a lot to many people but what it means is it's as low as we can go and everything else it's just maths. Now I'm not very good at maths but I'm quite good at supplying activity monitors.

00:03:58	The other important thing is it's about free living measurement. Hopefully those of you that have worn the activity monitor found that it didn't actually affect your lifestyle at all. It's waterproof so you can go for a swim if you want. If you want to do the gardening you can do the gardening. If you walk the dog you can walk the dog. The idea is that it measures what you actually do and that is the fundamental difference between what you might say "I walk the dog three times a week" we can actually tell whether you walked the dog three times a week.
00:04:27	So the device, we sent them out to you, we sent the invites out by email, the device was timed to start on arrival. Quite some complicated maths there to work out with Royal Mail when it was going to arrive and when it was going to hit your doorstep. But essentially it turned on at 10 o'clock in the morning, didn't matter whether you were wearing it or not it turns on at 10 o'clock in the morning. You wear it continuously on your dominant hand being you're left or right handed. And it records that data for 7 days. After that 7 days you got an email hopefully to return it back to us in the little packaging that we sent out to you. All in all it took about two weeks for each device to get through the mail system, for you to wear it, it to come back, us to download the data and it's a bit of a production line with our colleagues in Cardiff and you'll see about the numbers in a bit.
00:05:20	But it's quite important, a bit like Steve talking about going through the people fast enough at the centre we have to be able to turn these things around fast enough otherwise it would be going for years.
00:05:33	To give you an idea of what some of these data traces look like, these are graphical representations of the data okay so this isn't what the researchers see, the researchers see a whole heap of numbers but it doesn't actually make a lot of sense. But, if you look up the top there you can see swimming, this is my colleague Nicola doing lengths of a local pool and you can see when she turned laps at the end. So the devices are really sensitive. Rowing that's our Deputy CEO, Tim Peatman, Dr Tim is on the rowing machine. Already you can see that there are distinctive patterns to different types of exercise. This has never really been seen at this level of detail before.
00:06:15	Now I'm being a bit flippant about whether you walked the dog, it's possible with some of the work that we're looking at that we can identify particular exercise types. At the moment we're already looking at things like walking, sitting, standing. The bottom one, that's me working at my desk. It's a bit messy and it's a bit difficult and you'll see with some of the people that we've got involved working with the project, that's the bit where they're interested in.
00:06:44	Where are we up to? We've sent 217,000 emails. I think we're about to get blacklisted by Google! We've sent out 95,000 devices and 51.7% of you said yes which is phenomenal so thank you very much, it keeps me going.
00:07:04	We're also aiming to get 100,000. As you can see we're getting towards the end and this is where the fun really starts. With Biobank we're all about collecting data and then we're about using data. We're about adding more data, I've talked about this being an enhancement project. We're going to add this to everything that you've already given us. So that will get used again.
00:07:25	93,000 data sets, there's about 2,000 going around in circles at any one time and very kindly when we ask you to wear them for 7 days, you do. So again thank you very much I know it's not always easy, people do have lives and we do appreciate it at Biobank when you do take part in these things we know that we ask you do to a lot and we are grateful that you do so.
00:07:53	So what are we doing with all the data? I talked earlier that you know this is about collecting data and doing something with it, the same as with Biobank in general.

	<p>We've got a working group with Professor Nick Wareham at the medical research council in Cambridge and we've pulled together the group to actually look at this data because we've got it all and then we thought "what do we do with it?" It's a big, big pile of numbers but what we're really interested in is how active you are. If you remember a little while ago I said these devices measure in fundamental units of G, of gravity. What that means is how fast your arm moves. What we want to do is to turn that into something that's a bit more representative of how fast the rest of you moves. Part of that is quite complicated mathematics about removing things that are associated with non-human movement so that might be when you're driving a car for example you'll get high frequency movement from the steering wheel. Well we're not really interested in that because it doesn't take too much effort to drive a car. But it's also got an importance for things of certain diseases or illnesses like Parkinson's where you have tremors that aren't under the control of the individual. We don't want to record those as activity because they're not strictly speaking activity.</p>
00:09:09	<p>We also take off a low level of frequency so that if people are just generally moving like I tend to waft about a bit, that's not activity. So already we're starting to define what is human activity and why are we interested and this is where Nick has been leading that in what scientists actually interested in.</p>
00:09:31	<p>Out of those data sets we've already collected those 90,000 odd 70,000 data sets have been processed through some fairly serious maths which I have no hope of understanding to actually generate what's called a summary variable and really that is about how active you are compared to everybody else at that time. So we can split it down to a particular of a day and say "are people more active at 5 o'clock in the afternoon, 9 o'clock in the morning" and we can link that to all the other data.</p>
00:10:05	<p>We are going to get to the end of the 100,000 hopefully October/November so if you haven't worn one there's still time, we'll get to you if you've got an email address. But there's also going to be work to look for in future studies it's not necessarily the end of looking at activity monitoring, we might well want to do it again. So at the moment there's talk about doing seasonal repeats to look at whether there's variation throughout the year or variation in particular individuals. Obviously some people are more active in the summer, some people are more active in the winter.</p>
00:10:38	<p>It's key that UK Biobank not only has this data that we can show the world that it's there. Part of what Nick and Soren and the rest of the group will be doing is actually putting a paper together of all the maths, all the bits of why we're doing things and the particular way that we're doing it for the outside world and hopefully that'll be published next year. This is the first time anyone's actually tried to qualitatively and quantitatively measure activity. So we're expecting that to be really interesting and it's going to be opening the floodgates because we've got the raw data, people can then choose to research it in any way they like but more importantly they can use it for other pieces of research so, if someone's researching on cardiac issues and they want to see how active someone is they can look at the summary measures, they don't just have to be activity researchers so it adds another facet to the research work that they can do.</p>
00:11:32	<p>That's about it. Over to questions...</p>
	<p>ENDS _00:11:39_</p>